

REMARKS

Upon receipt of this response, the Examiner is respectfully requested to contact the undersigned representative of the Applicant to arrange a telephone interview concerning the inventive merits of this application.

This application is rejected under 35 U.S.C. § 112, first paragraph, for the reasons noted in the official action. The inadequate written description rejection is acknowledged and respectfully traversed in view of the following remarks.

After consider of the raised rejection, the Applicant elects cancel claim 28, without prejudice from this application, while claims 27 and 30 are amended to limit the "yttrium salts" species to yttrium chloride which, as the Examiner notes, is disclosed within the specification. In view of such amendment, the Applicant respectfully submits that the raised rejection, under 35 U.S.C. § 112 first paragraph, should be withdrawn at this time. However, in the event that any further amendment to either claim 27 or claim 30 is believed necessary, the Examiner is invited to contact the undersigned to discuss such further amendment

Next, claims 14, 23 and 29 are rejected, under 35 U.S.C. § 102, as being anticipated by both "Electrodeposited Nanocomposite n-p Heterojunctions for Solid-State Dye-Sensitized Photovoltaics" by Regan et al. (hereinafter "REGAN et al.") and "Improved Performance of a Dye-Sensitized Solar Cell using a TiO₂/ZnOEosin Y Electrode" by Kim et al. (hereinafter "KIM et al."). In addition, claim 16 is rejected, under 35 U.S.C. § 103, as being unpatentable over REGAN et al. while claims of 17, 25 and 26 are rejected under 35 U. S. C. 103 (a) as being unpatentable over REGAN et al. or KIM et al., in a further view of Zangari et al. '826, (U.S. Publication No. 20020145826), with evidence from Sager et al. '920 (United States Patent No. 6,852,920) and Lopatin et al. '633 (United States Patent No. 6,340,633). Claim 24 is rejected under 35 U. S. C. 103 (a) as being unpatentable over REGAN et al. or KIM et al., in a further view of Cohen '947 (United States Patent No. 4,142,947) and Loch '567 (United States Patent No. 4,666,567). The Applicant acknowledges and respectfully traverses all of the raised anticipatory and obviousness rejections in view of the above claim amendments and the following remarks.

As all of the claims are rejected in view of the base references of REGAN et al. and/or KIM et al., either alone or in combination with Zangari et al. '826, Sager et al. '920, Lopatin et al. '633, Cohen '947 and/or Loch '567, the Applicant will first discuss the distinctions between the presently claimed invention and the base references of REGAN et al. and KIM et al.

The electrolytic treatment method, according to the present application, uses a low-frequency AC based application of current to perform a surface treatment of the particles of the nano particulate layer of the electrode. Ions from the electrolyte solution (in the preferred embodiment yttrium ions) are caused to be transferred *into* the surface of the particles forming the nano particulate layer. This is a process known as intercalation. As explained on page 4 of the published PCT pamphlet, in the preferred embodiment, ions are transferred into the surface to a depth of approximately 40 Å from the particle surface. The result is a modification

of the surface of the particles on the electrode which reduces surface defects and changes the Fermi level which leads to improved performance of photovoltaic cells fabricated using electrodes treated according to the presently claimed invention. It is important to note that the result of the method of the present invention does not lead to a buildup of material on top of, or between, the nano-particles, as is the case with both REGAN et al. and KIM et al.

REGAN et al. deposits "hole conductor" – a p-type semiconductor, CuSCN, filling the pores of the nano porous in the n-type semiconductor layer so that there is a large-area interface pn-junction between the original material and the deposited material. KIM et al. deposits a new layer containing a semiconductor ZnO and a dye Eosin Y onto the surface of the TiO₂. In both cases, a new material is deposited externally *on and around* the particles of the nano porous layer but is *not transferred into the surface of the particles*, as with the presently claimed invention.

In order to emphasize the above noted distinctions between the presently claimed invention and the applied art, independent claims 14 and 29 are both amended to now recite the features of "...electrolytically treating the nano-particulate layer in an electrolyte, wherein the electrolyte contains ions chemically different to the nano-particulate layer and the electrolytic treatment step comprises transferring the chemically different ions into the surface of the particles of the nano-particulate layer to a depth of approximately 40 Angstroms.." Such features are believed to clearly and patentably distinguish the presently claimed invention from all of the art of record, including all of the applied art. Further, as independent claims 14 and 29 are now amended to clearly distinguish presently claimed invention from REGAN et al. and KIM et al., it is also respectfully submitted that the claims dependent thereon are allowable by virtue of their dependency from allowable independent claims.

The Applicant acknowledges that the additional cited references of Zangari et al. '826, Sager et al. '920, Lopatin et al. '633, Cohen '947 and/or Loch '567 may arguably relate to the features indicated by the Examiner in the official action. Nevertheless, the Applicant respectfully submits that the combination of the base references of either REGAN et al. and KIM et al. with this additional art of Zangari et al. '826, Sager et al. '920, Lopatin et al. '633, Cohen '947 and/or Loch '567 still fails to in any way teach, suggest, disclose or remotely hint at the above distinguishing features of the presently claimed invention. As such, all of the raised rejections should be withdrawn at this time in view of the above amendments and remarks.

In the event that any further amendment to any of the claims of this application is believed or deemed necessary, then the Examiner is invited to contact the undersigned representative of the Applicant in order to discuss further amendment of the above identified application.

In view of the above amendments and remarks, it is respectfully submitted that all of the raised rejections should be withdrawn at this time. If the Examiner disagrees with the Applicant's view concerning the withdrawal of the outstanding rejections or applicability of

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the REGAN et al., KIM et al., Zangari et al. '826, Sager et al. '920, Lopatin et al. '633, Cohen '947 and/or Loch '567 references, the Applicant respectfully requests the Examiner to indicate the specific passage or passages, or the drawing or drawings, which contain the necessary teaching, suggestion and/or disclosure required by case law. As such teaching, suggestion and/or disclosure is not present in the applied references, the raised rejection should be withdrawn at this time. Alternatively, if the Examiner is relying on his/her expertise in this field, the Applicant respectfully requests the Examiner to enter an affidavit substantiating the Examiner's position so that suitable contradictory evidence can be entered in this case by the Applicant.

In view of the foregoing, it is respectfully submitted that the raised rejections should be withdrawn and this application is now placed in a condition for allowance. Action to that end, in the form of an early Notice of Allowance, is courteously solicited by the Applicant at this time.

The Applicant respectfully requests that any outstanding objections or requirements, as to the form of this application, be held in abeyance until allowable subject matter is indicated for this case.

In the event that there are any fee deficiencies or additional fees are payable, please charge the same or credit any overpayment to our Deposit Account (Account No. 04-0213).

Respectfully submitted,



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